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ABSTRACT

This report is intended to provide publishers and product developers with a summary of background information about strategy instruction for disabled learners. It also offers suggestions for how media and materials could be produced and designed to facilitate the teaching and learning of strategies. The first section looks at cognitive and metacognitive learning strategies, defines terms, and shows their relevance to instruction. The second section examines the evidence showing how learning strategy instruction can help students with learning problems. It identifies characteristics of effective and ineffective learners, notes effects of strategy deficiencies on learning, reviews the research, and identifies effective strategies. Section Three considers the nature of good strategy instruction with examples from reciprocal teaching and the Strategies Intervention Model. Section Four examines the role of media and materials. It offers design recommendations and notes the use of media and materials in professional education. The section offering conclusions notes specific issues of concern to publishers and developers including the feasibility of developing coordinated materials, marketing concerns, and developing teacher training materials. (DB)

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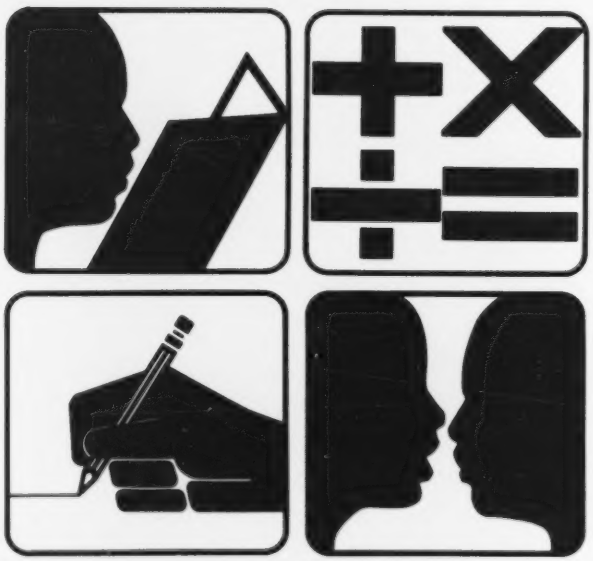
Cognitive and Metacognitive Learning Strategy Instruction: Its Relevance for Media and Material Design



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Cognitive and Metacognitive Learning Strategy Instruction: Its Relevance for Media and Material Design

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January 1989

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PREFACE

The Information Center for Special Education Media and Materials is a project of the United States Department of Education's Office of Special Education Programs. Housed at LINC Resources in Columbus, Ohio, the Center's mission is to increase the quality, availability and use of special education media and materials. Specifically, the Center hopes 1) to increase the quantity of media and materials that are designed according to instructional principles that have proved to be effective with special education populations, and 2) to identify ways in which these and other media and materials can best be used to further learning opportunities for handicapped children.

We know that 90% or more of a student's classroom time is spent with media and materials, yet such materials are but one component of the instructional process. Learner characteristics, expected outcomes, teacher effectiveness, administrative support, the learning environment, educational philosophy, and instructional methods also contribute to positive or negative educational experiences. Clearly, any meaningful effort to improve media and materials must take place within the larger context of improvement of instruction. Therefore, the Center must pursue its goal by identifying instructional methods that are effective with special education populations, investigating the factors that make these methods work in the classroom, and specifying the roles which media and materials can play to facilitate the instruction of these methods.

The Center's role, then, is to provide leadership in these endeavors. It does so by focusing the attention of practitioners, publishers, and researchers on the major issues and questions related to improving the design and use of media and materials. Annually, the Center convenes members of the research, school, and publishing communities to think actively together, addressing identified issues and questions. We at the Center believe that it is only through reliance on the wisdom and realities of all three communities that we can hope to encourage refinement of promising methods, accelerate the incorporation of proved principles into instructional products, and foster the appropriate and effective use of these methods by classroom teachers.

CONTENTS

ACKNOWLEDGEMENTS		iii
PREFACE		v
INTRODUCTION		1
SECTION ONE	Cognitive and Metacognitive Learning Strategies: What are They?	3
SECTION TWO	Why Does Learning Strategy Instruction Hold Promise for Students with Learning	5
SECTION THREE	What Makes for Good Strategy Instruction?	9
SECTION FOUR	Media and Materials: Helpmates to Instruction	15
CONCLUSIONS AND CONSIDERATIONS		19
APPENDIX A	1988 Instructional Methods Forum Participants	23
APPENDIX B	Sample Record from the ICSEMM Database	33
BIBLIOGRAPHY		35

INTRODUCTION

Can students with learning problems be taught to be more effective, active, independent learners? This fundamental question is at the heart of a significant body of recent educational research, that involving the investigation of the impact on children's learning of cognitive and metacognitive strategy instruction. Research results point to the potential benefits of cognitive and metacognitive strategy techniques for educating students with learning difficulties. Numerous instructional approaches have been designed and developed for the purpose of helping students with learning problems become more effective, efficient, and independent learners. Examples of some of these approaches include The Strategies Intervention Model, Reciprocal Teaching, the Direct Explanation Model, Self-Instructional Strategy Training, and Informed Strategies for Learning.

Without question, special educators throughout the country--at the district, building, and classroom levels--will be giving increasing attention to strategy instruction and will be attempting to make decisions about its appropriateness for use with their special education students. The intent of this report is to provide publishers and product developers with a summary of background information about this method of instruction as well as to offer suggestions for how media and materials could be produced and designed to facilitate the teaching and learning of strategies. (A more detailed discussion of strategy instruction is included in the Information Center's report, *Cognitive and Metacognitive Learning Strategies--Their Role in the Instruction of Special Education Students.*)

This past year, the Information Center for Special Education Media and Materials, a five-year project funded by the U.S. Department of Education's Office of Special Education Programs, has examined the research and realities of cognitive and metacognitive learning strategy instruction. This examination has occurred in two ways: through the review of research studies and the sponsorship of an invited forum. The Instructional Methods Forum, held in Washington, D.C. in August, 1988, was attended by a select group of researchers, practitioners, and publishers with experience in the strategy instruction area. The intent of the Forum was to engage these three groups in discussion of general issues surrounding the classroom use of strategy approaches with special education populations. In addition, a specific focus was the role media and materials could play in this area.

The Forum served to raise and address those questions that would be asked by educators trying to understand the nature and philosophy of strategy instruction and to identify the factors that are involved in successfully applying these techniques to instruct special education students in the resource room or regular classroom. Such fundamental questions include the following: Do learning strategy approaches really work with handicapped students? How could those students instructed in strategy use be expected to change their approach to learning? What components or characteristics of strategy

instruction programs seem to work best? What is required of the teacher, and how could he or she best be trained, in using these instructional approaches? Do media and materials have a role in helping to instruct students and teachers in strategy use, and if so, how can that role be enhanced?

Clearly, these questions have no simple answers. Discussion of them by individuals who have devoted considerable attention to researching, teaching, and/or publishing materials that incorporate strategy instruction have produced illuminating and sometimes divergent opinions and insights. We hope that these opinions and insights will assist publishers and developers as they make design and production decisions.

SECTION ONE

Cognitive and Metacognitive Learning Strategies: What are They?

Before examining some of the key questions about cognitive and metacognitive strategy instruction, terminology must be defined. For some, the terms "cognitive" and "metacognitive" conjure up images of elusive and esoteric philosophies. Publishers and developers need to be assured that while the theories upon which cognitive and metacognitive strategy instruction are based are not simplistic, they are quite understandable and practical.

Working Definitions

For the purpose of this discussion, *cognitive learning strategies* refers to those techniques, procedures or processes that students apply in learning situations to help them acquire, store or express information more effectively. In a sense, strategies empower students by arming them with techniques that facilitate learning. For example, reading strategies such as paraphrasing and summarizing help students acquire important information from the written word; listening strategies such as notetaking help students enhance their abilities to glean important information from lectures; memory strategies such as first-letter mnemonics help students learn and retain facts. The strategies are intended to help students learn, solve problems, and complete tasks independently (Deshler and Schumaker, 1986).

However, as Annemarie Palincsar (1986b) points out, knowing strategies alone is not enough to insure their effective and appropriate use. Something more is required, and that something is metacognition. As defined by Baker and Brown (1984), *metacognition* is an awareness of the skills, strategies, and resources that are needed to perform a task *and* the ability to use self-regulatory mechanisms to successfully complete the task.

As the above definition indicates, metacognition generally is thought to have two components. The first relates to an individual's abilities to assess the demands of the task at hand and also to understand his or her own strengths and weaknesses in relationship to the task (Reeve & Brown, 1985). As an example of metacognitive knowledge at work, an adult about to read income tax form directions realizes that this task, while important, will not be particularly entertaining. A person who has had previous experience with tax forms also will know that the reading task will be demanding and will require considerable concentration. This knowledge will probably lead the prospective reader to make several decisions about when, where and how to read the directions.

The second component of metacognition is concerned with regulating the performance of a task. In learning situations, this form of metacognition involves applying a variety of processes that, in information processing parlance, are often referred to as "executive" functions; they include planning, monitoring, and evaluating the learning process (Baker & Brown, 1984). To illustrate, after reading a section of the tax form directions, one may ask, "Did I understand that?" An effective learner who answers "No" will take some

corrective action, such as rereading the section or reading ahead to see if further information provides clarification.

Effective learners routinely and often unconsciously use their metacognitive capacities as they select cognitive strategies that they think will work in a learning situation, and also as they apply the strategy, monitor its use, evaluate its effectiveness, and make adjustments as necessary. For effective learning to occur, cognitive and metacognitive strategies need to be used in concert.

Relevance to Instruction

In recent years the theories of cognition and metacognition have served as the basis for development of many instructional approaches designed to help students become more effective, independent, and thoughtful learners. While the usefulness of this type of instruction is not confined to students with special needs, it holds particular promise for those children, since it addresses learning deficiencies often observed in special education populations.

It is important to stress that the instructional approaches referred to in this report emphasize the interrelationship of cognitive and metacognitive processes. The aim of these approaches is to teach students effective learning techniques *and* why, when, and how to use them. And, while these approaches differ in the methods they utilize for teaching students, they share a common goal: the development of a more independent learner.

Most developers of strategy approaches also would agree that this method of instruction should not be treated as a quick fix or a temporary add-on to the current curriculum. Nor is it intended to supplant other valid educational methods or curricular offerings. Rather, strategy instruction is intended to be used in harmony with other methods, to enrich the curriculum as a whole. To achieve this ultimate goal requires that strategy teaching become a natural and integral part of the curriculum and instruction.

"For effective learning to occur, cognitive and metacognitive strategies need to be used in concert."

But while researchers and developers of these approaches hold these high goals, they realistically caution that as a remedial technique, strategy instruction will not necessarily work for all children. Some children's problems will not be amenable to correction by this method, while other children will lack the prerequisite knowledge and skills needed for them to benefit from the teaching of learning strategies. Yet for many special-needs students, strategy instruction holds the potential for increasing learning effectiveness. The next section addresses why this may be so.

SECTION TWO

Why Does Learning Strategy Instruction Hold Promise for Students with Learning Problems?

Learning strategy instruction has caught the attention of special educators because it addresses some of the observed learning deficiencies of many special education students. These students usually are ineffective learners, and the main goal of strategy instruction is to increase learner effectiveness.

Characteristics of Effective and Ineffective Learners

Those who have developed strategy instruction interventions are quite cognizant of research findings showing significant differences between how effective and ineffective learners approach learning situations. For example, effective learners frequently develop and use an array of learning strategies without being specifically instructed to do so. With age and experience, children who do not have learning problems seem to infer techniques that help them learn better (Brown et al., 1983). Many of these students have observed these strategies being modeled by their parents, teachers and other adults. These techniques may not be the most sophisticated, and room exists for improving their efficiency (Pressley et al, in press-b), yet these students, through their experiences, develop a basic knowledge of learning procedures or strategies that work for them.

The same cannot be said for children with learning problems. Studies have indicated, for example, that learning disabled students tend not to infer or to develop naturally the array of strategic behaviors observed in more effective learners (Englert et al., 1988; Bos & Fillip, 1984; Wong & Jones, 1982).

Effects of Strategy Deficiencies on Learning

How is this lack of strategic behavior exhibited in school work? One example can be seen in the area of reading. Ineffective learners generally are poor readers. They do not consciously monitor their understanding of what they read, they frequently are not aware of the purpose of reading, they do not adjust their reading rates to match the demands of the reading task at hand, they have difficulty relating their past experiences to what they have read, and they do not use context to construct representation of text (Baker & Brown, 1984; Paris & Myers, 1981; Wong & Jones,1982). These students show little evidence of skimming, looking back, or employing strategies to remedy problems even when they have detected them. Too, poorer readers frequently seem to be unaware that they must extend efforts beyond decoding to make sense of what they read (Brown, 1985; Brown & Campione, 1986).

Good readers, on the other hand, plan their reading approach, allocate their attention to the task, monitor their comprehension, and take corrective action when needed. In other words, they appropriately apply an array of reading strategies to help them obtain meaning from text (Brown, 1980;

Baker & Brown, 1984; Duffy et al., 1987c; Luftig & Johnson, 1980).

Contrasts between good and poor learners are also evident in other subject areas such as writing and math. Generally, good learners in any area are good strategy users. Poor learners, including many special education students, on the contrary, often are strategy-deficient. For example:

- Learning disabled children commonly experience problems in writing (Graham & Harris, in press; Englert et al., 1988) and reading (Oka & Paris, 1987). These deficiencies can be traced to lack of strategic behavior in those areas (Wong & Wilson, 1984; Englert et al., 1988).
- The reading problems of many hearing impaired children, according to Erickson (1987), stem from several sources: lack of world knowledge, lack of linguistic proficiency, and lack of knowledge about metacognitive strategies. As a result of the last deficiency, deaf children often do not understand the meaning of reading.
- Borkowski (Borkowski et al., 1986) has noted that while wide differences exist in strategy behavior among mentally retarded students, with some capable of developing strategic behavior on their own without being instructed to do so (Kellas et al., 1973), generally, mentally retarded students lack effective learning strategies and self-management skills (Borkowski & Cavanaugh, 1979; Brown, 1974).

What Is Known From Research

The learning strategy deficiencies of special education students are well-documented. Special educators searching for more effective ways of remediating their students' learning problems naturally are curious about approaches and programs that purport to address some of the learning and motivational needs clearly evidenced in special education students. But does research confirm the utility of these methods with special education students? Specifically, is there data to show whether or not special education students can be taught strategies? If they can be, do these students then use the strategies in their school work, and with what results?

Several studies have been conducted over the last few years to attempt to answer these questions. It is important to stress that studies in this area do not constitute a cohesive body of research, and that different researchers have worked from different definitional and philosophical bases. Their studies have employed a variety of designs, tested a variety of strategies and approaches, and involved a variety of subjects and students. Therefore, the generalizations presented in this section in answer to the above questions should not be assumed to apply to all research of strategy approaches.

"...learning disabled students tend not to infer or to develop naturally...strategic behaviors observed in more effective learners."

It should be remembered, also, that strategy instruction does not benefit all students in all circumstances. For example, some youngsters may not possess the necessary prerequisites to profit from these approaches to learning, while other young people, particularly more able learners, may already effectively apply learning strategies. Too, within groups, classes or categories individual students vary widely in their skills and capabilities. Currently, as Michael Pressley and his colleagues (Pressley et al., in press--a) have pointed out, little is known about how such individual differences may be used to predict which students may most benefit from strategy instruction.

What *is* known from research is that many students with learning problems are capable of learning and using learning strategies. The degree of success noted for any one student will depend on factors such as the nature and severity of the student's handicap, the age of the student, the strategies taught, and the approach used.

Among students with handicaps, learning disabled children at both the elementary and secondary level have most frequently been the subjects of research in strategy learning and use. Results of numerous studies lead to the general conclusion that learning disabled students at both school levels can be successfully taught to use strategies (Wong, 1986; Palincsar & Brown, 1986; Clark et al., 1984; Wong & Jones, 1982; Wong & Wilson, 1984; Chan et al., 1987; Chan & Cole, 1986; Schumaker et al., 1982; Schmidt, 1984; Reid & Borkowski, 1985; Brown & Palincsar, 1987; Harris & Graham, 1985; Harris et al., 1988). While few studies have been conducted on mentally retarded students, results of some of these studies provide evidence that such students, also, can be taught to use strategies (Campione & Brown, 1977; Kendall et al., 1980).

Although research indicates that handicapped children can be taught strategies, do these students

use them appropriately and independently in situations that warrant their use? Fewer studies have examined this generalization issue, but some do show that learning disabled students have successfully generalized reading and writing strategies. Research has revealed that generalization is enhanced when, as a part of the training process, students are informed of the purpose of the strategy and of ways in which it could be used outside the training environment (Schumaker et al., 1982; Schmidt, 1984; Brown & Palincsar, 1987; Harris & Graham, 1985).

"What *is* known from research is that many students with learning problems are capable of learning and using learning strategies."

Studies have revealed that mentally retarded students have more of a problem maintaining and transferring learned strategies (Gardner, 1985; Campione & Brown, 1977). Researchers have theorized that the reason for the failure of these students to apply taught strategies may be that they were not specifically informed as to why the strategies might be useful or helpful (Campione & Brown, 1977). This position is supported by studies showing that maintenance and transfer of skills among retarded students is enhanced when these students are taught why the strategy is effective and are given the opportunity to practice it in multiple settings (Belmont et al., 1978; Kendall et al., 1980). Also, other studies suggest that the mental age of the student plays a key role in generalization. Those students with higher mental ages may be more likely to transfer use of strategies than students with lower mental ages (Brown & Barclay, 1976; Brown et al., 1979).

A final question must be raised: if students taught to use strategies can do so in appropriate post-training situations, do the strategies make a difference in the overall learning abilities and academic performances of these students? As might be expected, even fewer studies have addressed that question. But once again, positive results can be cited. As examples:

- The Learning Strategies Curriculum program, developed at the Institute for the Study of Learning Disabilities at the University of Kansas, teaches adolescent learning disabled students an array of strategies aimed at improving these students' reading, listening, and writing skills. This approach reportedly has been successful in raising students' grades in regular classroom settings (Schumaker et al., 1982; Schmidt, 1984).
- The Reciprocal Teaching approach, developed by Palincsar and Brown, has succeeded in improving students' scores on the Gates-McGinitie standardized reading comprehension tests (Brown & Palincsar, 1987);
- The Direct Explanation approach developed by Duffy, Roehler, and others has been successful in significantly improving students' scores on the word-study subtest of the Stanford Achievement Test (Duffy et al., 1987c).

In conclusion, research results point to the potential benefits of strategy instruction. It is important to remember, however, that results vary from approach to approach. Publishers who are considering developing and producing materials incorporating strategy instruction principles are urged to analyze results of pertinent studies that assess the effectiveness of strategy approaches with special education students.

Effective Strategies

Researchers such as Michael Pressley, in addition, recommend that publishers carefully select those strategies on which they will focus. As Pressley and others (in press-b) point out, while many strategies have been proposed for instructional application, few have been adequately evaluated to date, individually or within programs. And some strategies that have been evaluated have been shown not to make a difference in student performance. Pressley and his colleagues analyzed reading strategy research involving students between the third and eighth grades; only research that included a comparison or control group was examined. As a result of this evaluation, six strategies were identified that have been proven in controlled experiments to help children remember and comprehend what is read. Those strategies are summarization, imagery, story-grammar, question generation, question answering, and prior knowledge activation.

It is important to remember that Pressley's review was not confined to special education applications; furthermore, it only involved memory and comprehension strategies related to reading instruction targeted to third through eighth graders.

Future research may prove other strategies effective as well. Yet these findings underscore the importance for publishers to go beyond the superficial and to ask hard questions about research findings.

But the publisher should not stop there. For as valuable as research findings are in describing the effectiveness of a given approach in a study situation, they obviously do not tell the whole story. The opinions, observations and insights from teachers who have taught strategies should be sought and considered. (Note: The listing of ICSEMM 1988 Instructional Methods Forum participants in Appendix A contains the names of several school-based practitioners who have been involved with specific strategy instruction approaches.)

Thus far the theories and research surrounding strategy instruction have been discussed. The next section contains examples of approaches that have been developed and used with children experiencing learning problems and a discussion of instructional features thought to be important components of strategy instruction.

SECTION THREE

What Makes for Good Strategy Instruction?

Many strategy instruction approaches have been developed for use with children with learning problems. These approaches differ in the teaching techniques applied, students involved, subjects addressed and strategies taught. Two examples that illustrate these points are Reciprocal Teaching and The Strategies Intervention Model.

Reciprocal Teaching

Reciprocal Teaching is an interactive teaching approach based upon theories that social interactions play a prominent role in the learning process (Brown et al., 1983; Palincsar & Brown, 1988). Developed by Annemarie Palincsar and Ann Brown, Reciprocal Teaching originally was designed to improve students' reading comprehension by teaching them four strategies: summarizing the main content of what has been read, formulating potential test questions, clarifying ambiguities, and predicting what may come next (Palincsar, 1986b; Palincsar & Brown, 1984; Brown & Palincsar, 1987). These strategies are typically used by expert readers, yet new readers and children who learn slowly seldom employ them (Brown & Palincsar, 1987). The strategies are usually taught to students through a series of dialogues between the teacher and small groups of students. The teacher and students engage in discussions which focus on ascertaining the meaning and significance of a passage that has been read silently by the students. While the teacher begins Reciprocal Teaching instruction as the leader, control of the dialoguing technique gradually passes to the students as they gain proficiency in this method (Palincsar & Brown, 1984; Brown & Palincsar, 1987).

The Reciprocal Teaching approach has been used with students from first grade through college and with special education populations (Brown, 1985; Brown & Palincsar, 1987; Andrews, 1988). Generally, students involved are below average in reading comprehension but have average reading decoding skills (Brown & Palincsar, 1987). While this method mostly has been used to enhance reading skills, its developers believe the method could be used within other content areas such as in mathematics to improve arithmetic reasoning (Brown & Palincsar, 1987).

Media and materials are used in both instructing students and training teachers in this method. Children in Reciprocal Teaching classes are introduced to the strategies through worksheets that give them some initial, minimal competency in using the strategy in isolated contexts before they apply it to their formal reading (Fine, 1988). Passages from basal readers and a variety of other reading materials serve as the content to which strategies are applied. Videotapes are utilized in teacher training to demonstrate the approach; videotaping of teachers prior to their involvement in Reciprocal Teaching has been helpful, too. These tapes are used to analyze trainees' typical classroom instruction so that training can be altered to address the individual teaching styles of the teachers to be trained (Fine, 1988). A training manual specifically designed for

educators who want to use this method or train others to do so is under preparation by Dr. Palincsar (Palincsar, 1988).

The ultimate goal of Reciprocal Teaching is to influence how students interact with the learning situation. It aims not just to remediate an immediate educational deficiency but also to enhance students' problem-solving abilities (Palincsar, 1986b; Brown & Palincsar, 1987).

The Strategies Intervention Model

The Strategies Intervention Model was originally developed at the University of Kansas Institute for Research in Learning Disabilities by Donald Deshler, Jean Schumaker and their colleagues. This model incorporates the Learning Strategies Curriculum, an approach to strategy learning that was specifically designed to help learning disabled adolescents cope with the rigorous demands of the secondary curriculum (Deshler & Schumaker, 1986). Since its development, the Learning Strategies Curriculum has been adapted by the Institute for use with younger learning disabled students at the fifth and sixth grade level and with older students at the college level.

Instruction is organized into three major strands. The first strand is reading-oriented and focuses on techniques for acquiring information from written materials. Strategies taught within this strand include Word Identification, Visual Imagery, Self-Questioning, Paraphrasing, Interpreting Visual Aids, and Multipass. This last strategy is designed to be used by students to process information from textbooks (Deshler & Schumaker, 1986). The second strand focuses on identifying and storing important information. Included are the Listening and Notetaking, First-Letter Mnemonic, and Paired-Associates strategies (Deshler & Schumaker, 1986). Strand three helps students to write and to demonstrate competence in academic tasks such as report writing and test taking. Strategies included in this strand include Sentence Writing, Paragraph Writing, Theme Writing, Error Monitoring, Assignment Completion, and Test Taking strategies (Deshler & Schumaker, 1986).

Students are taught a set of self-instructional steps for each of these strategies. When faced with an appropriate application for the strategy, students are to apply it following the steps they have learned (Deshler et al., 1984b). Strategies are taught individually, and mastery of one strategy is required before the next is taught. Typically, teachers learn to teach, and students are taught, three strategies per year (Lenz, 1988).

In teaching these strategies to students, teachers employ a multistep process that includes analyzing the current learning habits of the student; describing the strategy and the steps to using it; modeling the strategy using a think aloud-technique; requiring the student to rehearse verbally the steps of the strategy; and providing opportunities to apply the strategy in controlled materials similar to those found in school settings and, later, with actual classroom materials. During instruction and practice, teachers provide information and corrective feedback (Deshler et al., 1981; Deshler et al., 1984a).

Throughout the instructional process, the teacher is cued to discuss when to use the strategy as well as how to identify situations related to strategy use, and the student is prompted to become actively involved in the learning process. Students are to describe how they are thinking about the use of the strategy, to identify situation-based modifications in the strategy, and to monitor their progress toward successful and independent use of the strategy.

The Learning Strategies Curriculum uses an array of media and materials. Filmstrips, audiotapes and activity sheets are among the items used to instruct students (Lenz, 1988; Deshler et al., 1984a); videotapes and manuals are used in the training of teachers. A teachers' manual has been produced for each strategy in the Learning Strategies Curriculum (Lenz, 1988).

"The ultimate goal of Reciprocal Teaching is to influence how students interact with the learning situation."

The goal of instruction in the Learning Strategies Curriculum is to teach learning disabled students how to become effective and eventually independent learners. However, this approach is often called into use as an attempt to save students from failure. For example, Harford County Schools in Maryland, working with Dr. Donald Deshler, Director of the Institute for Research in Learning Disabilities, and Dr. Karen Harris of the University of Maryland, recently produced curriculum guides in math and writing instruction that incorporate the instructional approaches found in the Learning Strategies Curriculum. One main motivation for this effort was to help the district's learning disabled students to acquire the skills needed to pass statewide

competency tests--passage of which is necessary to receive a high school diploma (Harford County Schools, 1985; Harford County Schools, 1988).

While the Learning Strategies Curriculum is often employed in this "fix it" manner, its usefulness is not confined to such applications, for it is also effective in a more comprehensive, preventative mode. Nor does its extensive use with learning disabled youngsters prohibit its practice with other populations of students. For example, researchers at the University of Florida have been investigating the use of the word-identification strategy with mentally retarded children in the third grade, and the Broward County School District in Fort Lauderdale, Florida has implemented the curriculum as part of its dropout prevention program (Lenz, 1988).

Components of Strategy Instruction

The two examples above illustrate the differences that are evident among the several strategy instruction approaches. But while differences are apparent, so too are similarities. Analysis of strategy instruction approaches reveals several characteristics, procedures, or components that cut across many of these approaches and that are believed to contribute to successful acquisition and use of strategies. These components not only give educators guidance on how to judge or develop strategy instruction approaches, but they also give publishers and developers clues as to where media and materials may assist in such instruction. Some of these components relate to the planning of instruction; others pertain to techniques and methods used by teachers when instructing students. What are these important planning and implementation components of strategy instruction?

Planning components.

▸ One of the most critical aspects of effective strategy instruction is making an initial determination about whether students will benefit from it. Students often need to possess prerequisite skills or knowledge in order to profit from strategy instruction (Meichenbaum, 1985; Brown et al., 1983; Graham et al., 1987; Deshler et al., 1984b; Palincsar, 1986b). In addition, students will differ in their current level of strategic behavior (Deshler & Schumaker, 1986). Therefore, strategy instruction approaches should begin with appropriate assessment and analysis of students' knowledge, skills, and current strategy proficiencies.

▸ After the determination has been made that a student or students will benefit from this type of instruction, planning should focus on how to structure the an environment to enable students to be active participants in the learning of strategies. Students must have opportunities available to them for exploring and articulating their thinking processes. Presenting strategy information in a "lecture only" format works against the development of self-directed learning that is the aim of this method (Dowd, 1988; Harris, 1988; Palincsar, 1988; Meichenbaum, 1985).

▸ Most educators acknowledge the pivotal role that motivational states play in learning. Attention to motivation is particularly crucial in strategy instruction targeted to handicapped students: after years of failure, such students often exhibit negative concepts about their ability to learn. Thus instruction should be purposely planned to help students develop positive beliefs about their learning abilities (Ellis et al., 1987a; Borkowski et al., 1984; Brown et al., 1983; Graham et al., 1987).

A motivational component can be overt and direct, but it can also be interwoven throughout the instructional process. Strategies that challenge yet are not so difficult as to frustrate and discourage can foster motivation (Pressley et al., in press-a). Instilling in students a sense of control over their learning tasks also is thought to lead to increased motivation (Oka & Paris, 1987), as is the supplying of appropriate feedback and encouragement (Brown & Palincsar, 1987; Brown, 1985; Deshler et al., 1981; Deshler et al., 1984a).

▸ When strategy instruction is being planned, provision should be made for incorporating an evaluation component to be used to periodically assess the effectiveness of the strategy instruction (Palincsar, 1988; Harris, 1988). Student progress should be reviewed to determine if the expectations for the instruction are being met, and, if not, what adjustments are needed in the instruction. Once strategies are learned, as Harris points out, teachers should determine if the strategy is being appropriately maintained and generalized. If not, booster sessions and strategy reviews should be provided (Harris, 1988).

Implementation components.

▸ When introducing a strategy, teachers should build upon the prior experiences and knowledge of students (Brainin, 1985; Turnure, 1986; Paris & Oka, 1986a; Delclos et al., 1984). New subject-area knowledge as well as new strategy knowledge should be linked to students' existing knowledge base. Students also should be taught the relationship between and among strategies and how they

complement each other.

- Students need to be told why they are learning the strategy, with explicit instruction about the importance of the strategy as well as about how and when to use it, in and outside school. This knowledge has been shown to be very important in determining whether or not students transfer their use of strategies to appropriate school and other situations (Brown et al., 1983; Palincsar, 1986b; Brown & Palincsar, 1982; Brown & Palincsar, 1987; Ghatala, 1986; Borkowski et al., 1986; Brainin, 1985; Paris & Oka, 1986a; Pressley, 1986; Meichenbaum, 1985; Duffy & Roehler, 1987; Pressley et al., in press-a; Graham et al., 1987; Graham, 1988).
- Strategies need to be taught explicitly and clearly. Such explanation should include teacher-modeling of the strategy being taught (Ellis, 1986; Ellis et al., 1987a; Brown & Palincsar, 1982; Pressley & Levin, 1987; Paris & Oka, 1986a; Duffy & Roehler, 1987; Brown & Palincsar, 1986; Englert & Raphael, 1988; Deshler & Schumaker, 1986; Graham et al., 1987; Graham, 1988; Harris, 1988). Duffy & Roehler (1987) and Herrmann (1988b) suggest that the teacher model not just the action involved in applying the strategy but also the thinking: this "thinking out loud" helps the student understand how to go about using the strategy and why. It is important to note that mental modeling, considered by many to be one of the most important components of strategy instruction, is also one of the most difficult for teachers to master.
- While strategy instruction should present the steps or processes for effectively applying a strategy, it should also teach students how to use strategies flexibly and appropriately (Palincsar, 1988; Sheinker, 1988; Roehler et al., 1986). Instruction should not lead the student to conclude that a strategy's use must be rigorously adhered to in all situations (Allington, 1988).
- Strategy instruction must incorporate ample opportunities for practice. As with the learning of anything, practice of strategy use is necessary to develop proficiency (Ellis et al., 1987a; Brown & Palincsar, 1982; Pressley, 1986; Duffy & Roehler, 1987; Paris & Oka, 1986a; Graham et al., 1987; Graham, 1988). But it is important that practice occur with a variety of materials (Feldman, 1988), and whenever possible, this practice should involve meaningful tasks (Harris, 1988). In The Strategies Intervention Model program, for example, students practice instructed strategies in controlled materials to reinforce the instruction, then they practice in regular classroom materials (Deshler et al., 1981; Deshler et al., 1984a). In this program, practice activities are intimately connected with generalization, to be discussed next.
- Throughout strategy instruction, appropriate feedback and direction need to be provided to students (Deshler et al., 1981; Harris, 1988; Brown & Palincsar, 1987; Graham, 1988). Sometimes this feedback is spontaneous and immediate, as in the case of such highly interactive approaches as Reciprocal Teaching. For others, such as the Learning Strategies Curriculum approach, direction and feedback are more structured but are clearly embedded throughout the procedure. Teacher-student interactions play an important role during the presentation and teaching of strategies. Teachers need to be sensitive to the learning of individual students and through appropriate interaction lead students to a greater understanding of the strategies being taught and how they can be used (Duffy et al., 1987c; Palincsar & Brown, 1988).
- Over the course of strategy instruction, control of the strategy must be transferred from the teacher to the student. In other words, students need to move from being other-regulated to being self-regulated if they are to apply these strategies in appropriate situations on their own, without external prompting (Palincsar, 1988; Brown & Palincsar, 1987; Brown & Campione, 1986; Meichenbaum, 1985; Brown & Palincsar, 1982; Graham et al., 1987; Harris, 1988; Duffy & Roehler, 1987).

This fading of teacher control obviously must occur gradually, with the teacher playing many roles along the way. For example, in Reciprocal Teaching, teachers function first as informants, then as mediators and facilitators, and then, after control has been transferred, as reflectors and coaches (Palincsar, 1988).

- It is unwise to assume that because a student learns a strategy he or she will use it in appropriate situations beyond the training setting, even when the student has knowledge of when the strategy could be used. Therefore, effective strategy instruction needs to incorporate generalization opportunities (Deshler et al., 1981; Deshler et al., 1984a; Pressley & Levin, 1987; Palincsar, 1986b; Meichenbaum, 1985; Ellis et al., 1987b; Ryan et al., 1986; Graham & Harris, 1987; Harris, 1988; Graham, 1988). For special education students receiving strategy instruction in a resource room, such generalization ideally would entail close cooperation between the resource and regular classroom teacher: the latter could prompt, cue, and reinforce the use of the strategies outside the resource room (Schmidt, 1984; Ellis et al., 1987a; Ellis et al., 1987b).

When introduced in the regular classroom, strategies can easily be generalized to content area

learning. Indeed, many believe that the ideal way to teach strategies is to integrate strategy instruction with content teaching (Feldman, 1988; Dowd, 1988).

While strategy instruction approaches differ in their degree of emphasis on the above components, they do generally emphasize the pivotal role of teachers in this instructional method. Indeed, several of the above characteristics of good strategy instruction are characteristics of good teaching. Many teachers who are untrained in and unfamiliar with formal strategy instruction programs incorporate some strategy instruction principles in their teaching. Their goal in doing so is to help their students become more capable, independent learners.

The above characteristics of instruction obviously have relevance for media and material design and use. The next section will address this issue while also touching upon the limitations of media and materials use in this type of instruction.

SECTION FOUR

Media and Materials: Helpmates to Instruction

There is no question that media and materials alone cannot effectively instruct students or teachers in strategy use. However, well-conceived, well-designed media and materials can provide crucial assistance to teachers. As Brown and others (Brown et al., 1983) have pointed out, materials can influence the learning process, and modifying the design of materials is an avenue to improving learning.

Certainly, media and materials have already demonstrated their potential to assist in the teaching of strategy instruction. For example, The Strategies Intervention Model incorporates videotapes, worksheets and filmstrips (Lenz, 1988); worksheets are used to introduce strategies in the Reciprocal Teaching approach (Fine, 1988); and videotapes of students applying strategies have been used by Harris and Graham in their strategy instruction intervention (Harris, 1988).

But what about media and materials not specifically designed for use with a specific strategy instruction approach? As a result of much of the recent research in learning strategy instruction, increasing numbers of classroom materials, including basal textbooks, are being developed that address the teaching of strategies. An example of the latter is the DC Heath basal reading series. These textbooks and teacher guides incorporate instruction based in part on the Informed Strategies for Learning approach developed by Scott Paris and others at the University of Michigan. The teachers' guide provides instructions to the teacher for helping students to preview, recall prior knowledge, set purposes, understand different ways of reading, understand different kinds of meaning, and monitor, clarify, and review comprehension.

While these texts are designed for use in regular classrooms by all students, the teacher guides contain suggestions for how the texts can be employed in instruction of students experiencing learning difficulties. The materials also can be adapted for use in a variety of classroom organizations.

Some teachers without knowledge of or experience with strategy teaching would be able to use such basal texts effectively to teach strategies, but most teachers probably would not be able to (Allington, 1988; Sheinker, 1988; Herrmann, 1988a). The reason for this belief is that strategy instruction is very dependent upon human interaction. That interaction is *crucial* not just in the instruction of students, but also in the development of teacher proficiencies in this method. Tina Miller (1988), the executive editor for reading at D.C. Heath, freely admits that it is difficult for media and materials to provide the interaction that is thought essential for effective strategy instruction.

Role of Media and Materials

However, the fact that media and materials cannot alone carry the burden of teaching strategies should not be interpreted to mean that these products do not have a role in this type of instruction. The truth is quite the contrary: media

and materials have a key role to play in strategy teaching. First, readily-available classroom resources can provide considerable assistance to teachers who are learning to teach strategies. According to Keith Lenz (1988), teachers report that the Learning Strategies Curriculum manuals, which include reproducible worksheets, are more helpful than workbooks or guides that only suggest activities.

Media and materials that support strategy teaching also are requested by teachers who have completed training and are teaching strategies in the classroom. With the increased interest in learning strategy approaches among professionals, one would expect a growing demand by teachers for strategy-oriented materials; indeed, according to Carole Fine (1988), teachers involved with a Reciprocal Teaching project found that traditional instructional materials no longer met their teaching needs. Hence the clear message from those who teach strategies is that functional, strategy-oriented media and materials are a crucial part of the classroom environment.

Secondly, one of the current truisms in education is that media and materials drive instruction. Media and materials lead; teachers follow. The extent of this assumption can be debated, but the fact remains that the instruction of some teachers, particularly new ones, frequently is guided by the media and materials they use. If that is the case, then classroom materials that incorporate strategies may serve as the point of introduction to strategy instruction for many. And while media and materials alone cannot bear the burden of teaching teachers to be proficient strategy instructors, strategy resources may inspire teachers to seek out additional training in this method. This may be more likely to happen when publishers provide inservice training in the use of their materials. While this inservice cannot be extensive or long-term, it may provide teachers with an awareness and understanding that results in a purposeful use of media and materials and a desire for more in-depth knowledge.

Finally, subject area materials that prompt or reinforce strategy use can contribute to strategy learning and teaching. Such materials can help students generalize strategies learned in another subject or instructional setting (a resource room, for example). At the same time, they can prompt teachers in the use of strategies.

Design Recommendations

Several design characteristics features for classroom materials have been suggested by strategy researchers who have studied applications of strategy instruction and teachers who have taught strategies to special education students. Many of these characteristics are just good design principles, not at all unique to strategy instruction. Developers and publishers need to be aware that few of the design recommendations have been studied to determine empirically if they increase achievement of students. However, these suggestions, based upon the experiences and observations of both school and university professionals who have studied and implemented strategy instruction, support the characteristics of good strategy instruction noted in the previous section of this report.

"...well-conceived, well-designed media and materials can provide crucial assistance to teachers."

1. Most fundamental of all suggestions is that materials be designed with the purpose of instruction and intended outcomes in mind (Palincsar, 1988). The content, activities, and format among materials in a program, series or curricular package should be consistent with and lead to the intended instructional outcome. For example, workbooks accompanying texts in which strategic approaches to learning are introduced should offer opportunities for children to practice those strategies in varied and realistic situations. As Fine (1988) has pointed out, a child instructed in reading comprehension strategies such as finding the main point and summarizing will need practice in applying those strategies to reading passages of more than a few sentences in length. Passages of increasing length should be included throughout materials, to help students apply their knowledge in increasingly demanding situations.

2. Teachers would benefit from having available to them an array of supplemental materials that help them teach or reinforce strategies introduced in textbooks. These supplemental materials are particularly needed for special education students. Perhaps basal text publishers could enter into working agreements with supplemental materials publishers specializing in the special education market. The supplemental publishers could develop materials keyed to strategies presented in texts, thereby providing students with more opportunities to practice what they have learned (Allington, 1988).

3. Developers and publishers who want to incorporate strategy instruction into their materials

are urged to be selective about the strategies they choose to present. It is recommended that products be developed that target a few powerful, proven, teachable strategies (Pressley et al., in press-a; Palincsar, 1986b; Harris, 1988). Developers and publishers need to be aware, however, that information about strategies and their effectiveness changes over time (Graham, 1988; Harris, 1988). As more information becomes available about the effectiveness of specific strategies, revisions in media and materials may be necessary.

4. Classroom materials should help to activate students' prior knowledge before presenting new information (Pressley et al., in press-b). Linking new information with what is already known is an effective learning strategy that all too often is ignored by teachers and excluded from media and materials. Questions to help activate prior knowledge could be included at the beginning of units in student materials and teacher guides. Or a section in the teachers' guide could provide general information on how to activate students' prior knowledge.

5. When teaching a strategy, teachers should explain the reasoning behind its use; materials can play a major role in elaborating on this aspect of strategy instruction. As Fine (1988) has indicated, materials frequently contain such directions to the student as "Read the passage and check the statement that best states the main idea," but seldom do the materials explain "how" to find the main idea or summarize what has been read. Teacher presentations, along with text explanations of the reasoning behind the "how to" of strategy use, would help make evident to many students what currently is hidden. Videotaped examples of students thinking out loud while using the strategies would also enhance student understanding.

6. Students need to learn how to be flexible in applying strategies (Sheinker, 1988; Allington, 1988). Media and materials can help demonstrate the decision-making involved in strategy selection and use; they also can illustrate appropriate and inappropriate strategy applications. Such resources also could provide the student with practice in applying the strategy in several contexts. Again, it is thought that video examples of students using strategies would be a particularly effective means of demonstrating flexible, appropriate strategy use. But written illustrations and exercises also could help teach and reinforce these concepts.

7. Generalization of learned strategies from the setting or subject in which the strategies are taught to the regular classroom or other subject areas has been problematic for special education students. These students would benefit from cues in content area texts (e.g., social studies and science) that would prompt their use of strategies. For example, codes or direct statements could be inserted in text margins or at the end of the section, reminding students to find the main point, summarize, think of questions, predict what may be discussed next, and so on, or a coding system could be used to prompt such actions. Students who have not specifically been instructed in strategy use could either respond to or ignore these suggestions. Inclusion of questions that probe students' thinking also are encouraged.

8. Just as students need explicit explanations about strategies and their uses, so also do teachers need good examples of how to introduce and teach strategies to students. Teacher guides and videotapes can provide these examples in a variety of ways: sample dialogues between teacher and students, scripts, and lesson outlines, to name a few. Such illustrations may be particularly helpful to the teacher new to this instructional approach (Sheinker, 1988; Palincsar, 1988). These examples should be generated by teachers and should reflect situations which would likely be encountered in the classroom. It is important, though, for teachers to understand that these samples are illustrations and, as such, are not to be rigidly adhered to in the classroom.

9. Enhancement of the teacher's understanding of his or her own way of thinking and teaching is an important goal of strategy instruction. Teachers need to take the time to think about their thinking if they are to make their thought processes explicit to students (Sheinker, 1988). Teacher guides could remind and encourage teachers to reflect on their teaching and investigate their own cognitive and metacognitive processes by including specific teacher-targeted exercises and questions.

10. Students need to be assessed from time to time to determine if they have acquired an understanding of strategies taught. While teacher guides often suggest methods for assessing students' content knowledge, seldom do they offer ways to measure students' strategic knowledge (Allington, 1988). Teacher guides need to assist in this area, and student materials as well could include end-of-chapter or unit questions, to direct students to assess their own understanding and use of strategies.

11. Teacher guides can be useful in providing not just the content and procedural guidance for strategy instruction, but also the encouragement needed by teachers attempting a new methodology. They can, for example, remind teachers to start

small, and not to try to do too much, too soon (Sheinker, 1988). Providing "testimonials" and implementation hints from teachers is one way this could be accomplished.

12. Teacher guides can help put strategy instruction in perspective, for it should not be thought of as an isolated approach to teaching or as a method to supplant other valid teaching methods. Teacher guides can assist teachers in viewing instructional approaches in an integrated manner and can provide examples of how such methods may be used together (Sheinker, 1988).

The Use of Media and Materials in Professional Education

Besides their role in instructing students, media and materials also are valuable tools in helping train teachers to teach strategies. Manuals and other media are available to instruct teachers in specific approaches to strategy instruction (Palincsar, 1988; Lenz, 1988). These manuals often include directions, suggested learning activities, and sometimes written scripts intended to provide the novice with ideas, illustrations and examples of how to apply strategy instruction (Lenz, 1988).

Most approaches, however, have not as yet developed training packages that could be used by district or college-level personnel to train staff or preservice teaching students. Possibilities exist to work with developers of these approaches as well as with teachers, to produce such training support items as manuals and videotapes of teachers and students.

Perhaps one of the most powerful use of media in strategy training is video recording (Dowd, 1988; Sheinker, 1988). Videotapes of teachers teaching strategies and students using them give an idea of how these methods can be applied, the behavior required of teachers, and examples of how students being trained might react.

Training manuals and videotapes have obvious implications for preservice as well as inservice training. It is believed that schools of education at colleges and universities should provide students with an introduction to strategy instruction concepts, and preferably opportunities to try strategy teaching during a supervised practicum (Herrmann, 1988a; Sheinker, 1988). Currently, few strategy training materials are available that specifically target preservice teachers. Opportunities exist for the development of such materials and for providing a review of strategy instruction principles in college texts.

In summary, the above discussion provides an overview of the ways media and materials support the teaching of learning strategies. Developers and publishers with an interest in producing strategy-oriented materials are encouraged to seek the advice of appropriate researchers *and* school-based professionals prior to and during product development. The Information Center for Special Education Media and Materials can assist developers and publishers in locating teachers and researchers who may be able to provide assistance (e.g., included in Appendix A of this report is a list of the participants of the 1988 Instructional Methods Forum sponsored by the Information Center; most of these professionals have had direct experience in researching or teaching strategy approaches).

In addition, a search of the Information Center's media and materials database can assist developers and publishers in determining what is currently available in this area. Indeed, the Center is actively collecting data about media and materials and, when applicable, the specific instructional approach each supports. Resources considered useful in strategy instruction are thus being identified. It is important to note, however, that the Information Center does not evaluate the adequacy of these items: rather, it collects and enters into its database information deemed useful to school-based practitioners seeking support in their teaching. The Center intends to produce and make available to professionals periodic listings of materials that can be used to teach specific instructional methods. Developers and publishers are encouraged to inform the Information Center about newly-developed products and to request product searches.

CONCLUSIONS AND CONSIDERATIONS

Information presented throughout this report indicates that cognitive/ metacognitive strategy instruction has potential for improving education for some handicapped students. Knowledge about appropriate applications of these methods will be refined as more is learned from research and practice.

As with any instructional method, there are a variety of issues that need to be considered by educators contemplating the implementation of cognitive and metacognitive learning strategies in the classroom. Likewise, publishers must necessarily address issues about the feasibility and profitability of designing media and materials based upon strategy instruction principles. For example, several of the design suggestions discussed in the preceding section would appear to require the lengthening of both student materials and teacher guides. Would doing so make these instructional items less attractive to professionals? Could materials be organized in such a way as to make them more user friendly, and thereby offsetting some of the perceived negative impact of increased length? Other questions also are apparent from the review of media and material suggestions appearing in the previous section. For example, could materials intended to prompt or cue strategy use, as opposed to teaching it, be designed so as not to be distracting to students and teachers unfamiliar with strategy instruction? Where would reference to strategy instruction best be placed: in teacher guides alone or in both teacher guides and student materials?

Which strategies to incorporate into materials also involves a major decision. As mentioned earlier in this report, to date, relatively few reading strategies have been validated through empirical studies. Publishers desiring to produce materials to support the teaching of reading strategies are faced with the choice of focusing on those proven strategies alone or including other strategies not as yet supported by research but that are thought by teachers and other professionals to work.

Too, publishers who do decide to produce materials that incorporate strategy instruction will need to consider how the materials will be updated and modified as new research information becomes available. Cognitive and metacognitive learning strategy principles are currently being investigated in a variety of subject matter areas and with children that do and do not have learning handicaps. The expected proliferation of new data about these methods will pose a challenge to publishers as they endeavor to evaluate its relevance to media and material design.

How feasible is the suggestion that textbook publishers work with supplemental materials publishers to develop coordinated materials? Many handicapped children, even those who are mainstreamed, may not benefit to the greatest extent possible from efforts to teach them to be more strategic if that instruction comes only from basal series. They may need additional instruction and practice in strategy use, and thus, need supplemental materials directed to this task. Should basal text publishers produce these supplementary items themselves, or would it be more advisable to

work with supplementary publishers in the special education market? Would supplemental publishers find such an arrangement beneficial from their product development point of view? In other words, would materials developed for the purpose of reinforcing instruction presented in a specific basal series be too limited in their application? Could such materials be designed to be sold and used independent of the basal series?

Of course the chief concern of publishers is whether or not a market exists for strategy instruction materials. It could be assumed that the size of the market is related to the number of teachers trained and school systems involved in learning strategy approaches. Such market data are not easy to come by. However, some data are available for the two strategy instruction approaches described earlier. We know that an estimated 30,000 teachers in 40 states have been trained in the Learning Strategies Curriculum (Daniels, 1988a); and Annemarie Palincsar has indicated that 74 teachers have formally been trained in Reciprocal Teaching through research and demonstration projects and an additional 8,000 teachers have attended presentations in which this teaching method has been explained (Daniels, 1988b). Training has occurred in other strategy instruction programs too. For example, Scott Paris estimates that approximately 1500 teachers have received training in the Informed Strategies for Learning program (Daniels, 1989). These clearly are not huge numbers. However, it should be remembered that teachers can be introduced to and/or educated about strategy instruction in several other ways: through preservice courses, journal articles and professional meetings, and training offered by publishers.

"Publishers...are faced with the choice of focusing on... proven strategies alone or including other strategies..."

As the number of researchers investigating cognitive/metacognitive principles and their application to education increases, more college level education courses will be incorporating content related to strategy teaching. Surely there is evidence of undergraduate and graduate level courses being offered at major universities, particularly those at which research in these methods is being conducted (Michigan State University, University of Kansas, University of South Carolina, University of Michigan, for example). Too, it is known that higher education professionals at over 100 colleges and universities nationwide have been trained provide instruction in the Learning Strategy Curriculum approach (Daniels, 1988a). However, once again, exact information about the extent of the teaching of other strategy instruction approaches at the preservice level is not known.

"If teachers do not have the background in strategy teaching would they use strategy-oriented materials effectively?"

Over the past few years considerable visibility has been given to strategy approaches through journal articles and practitioner-oriented publications. Numerous articles have appeared in publications such as *Exceptional Children*, *Journal of Learning Disabilities*, *Learning Disability Quarterly*, *Learning Disabilities Research*, *The Reading Teacher*, *Remedial and Special Education*, *Elementary School Journal*, *Teaching Exceptional Children*, *Educational Leadership* and *Instructor*, to name a few. Thus one could conclude that there is a high likelihood that higher education professionals and some teachers at least have been exposed to these concepts. As a result of such exposure, it could be assumed that some professionals have sought more information. For example, Palincsar reports that she received over 400 requests for information about Reciprocal Teaching as a result of an article appearing in *Instructor* magazine (Daniels, 1988a). One can only speculate as to the extent to which such interest translates into classroom practice.

Training offered by publishers also serves as another way teachers may become familiar with strategy teaching principles. As mentioned earlier, new basal series by publishers such as DC Health, Open Court, and Ginn, for example, incorporate strategy approaches. Some publishers such as D.C. Heath offer training. While this training obviously is intended to assist teachers in using the specific text materials, it also may serve as the point of introduction to strategy instruction for many teachers. However, since many of these strategy-oriented series have just been released, it is not expected that large numbers of teachers have been trained by publishers to date.

As has been indicated throughout this report, cognitive/metacognitive strategy instruction is a very teacher dependent instructional method. Not surprisingly, it is thought that for teachers to successfully teach strategies, they need to be familiar with the philosophy of this approach, understand the principles involved in its implementation, and, ideally, be trained in how to use it. If teachers do not have the background in strategy teaching would they use strategy-oriented materials effectively? Many probably would not. Clearly, publishers contemplating publication of such materials need to confront that question and to consider if they have options for providing teachers with guidance in using such materials.

The above represent some of the major issues and concerns that publishers must confront as they contemplate the feasibility and desirability of developing media and materials incorporating strategy instruction is feasible and desirable for them. There is no question that research and reports from teachers who have used strategy instruction support the conclusion that this method offers the potential for improving education for children with learning problems. Knowledge about this method will be refined in the years ahead as more is learned from research and practice. As with any method, translating the principles of strategy instruction into effective media and materials requires thoughtful, careful decision making. It is hoped that this report has provided some assistance in that decision making process.

APPENDIX A

1988 Instructional Methods Forum Participants

Richard L. Allington, Ph.D.
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Dr. Allington has written widely in the area of reading and learning disabilities. Currently, he is involved in research to study the whole school day experiences of Chapter I and mainstreamed mildly handicapped children and the effects of educational reform activities on student participation in remedial and special education programs. His other interests include how schools respond to reading failure and how policy and regulation influence learning.

Bonnie Armbruster, Ph.D.
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Dr. Armbruster serves as a researcher at the University of Illinois Center for the Study of Reading. She has published several articles addressing issues related to learning from text. Her current interests are reading and studying in the content areas and characteristics of textbooks that affect learning.

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Ms. Austin, as a special education teacher, served on the Harford County School Committee that oversaw the development of the district's curricular guide, *Teaching Writing to Students with Special Needs: A Learning Strategies Approach* (1988).

John G. Borkowski, Ph.D.
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During his career, Dr. Borkowski has studied contextual factors surrounding the development and generalization of strategic skills in young children. He is the editor, along with Professor Jeanne Day, of two recent books, *Intelligence and Exceptionality* and *Cognition in Special Children*, both published in 1987. Dr. Borkowski's interests include metacognition and inefficient learning; social contexts; and the emergence of cognitive skills in handicapped, normal, and gifted children.

Candace S. Bos, Ph.D.
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Dr. Bos is the co-author of the recent books, *Strategies for Teaching Students with Learning and Behavior Problems* and *Research in Learning Disabilities: Issues and Future Directions.* Her current interests are in research strategies that empower students to take control over their own learning, interactive teaching, and methodologies for integrating handicapped students in regular classes.

Lisa Pericola Case
Special Educator--Elementary Level
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Ms. Case's recent master's thesis focused on the use of self-instructional strategy training to improve the math problem-solving abilities of learning disabled students. She presented a paper based on her thesis at the April 1988 AERA meeting in New Orleans and has worked with Drs. Karen Harris and Steve Graham on strategy intervention projects. Ms. Case's other interests include children's involvement in independent reading and learning strategies in all curriculum areas.

Paula Cauthen
University of South Carolina
Education Student

Ms. Cauthen is a student in the College of Education at the University of South Carolina.

Anna Uhl Chamot, Ph.D.
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Dr. Chamot, along with Michael O'Malley, has developed several instructional materials for limited English speaking students. Their *Language Development Through Content* social studies and mathematics texts, published by Addison-Wesley, incorporate cognitive and metacognitive learning strategy principles. Dr. Chamot has had articles published in an array of language oriented journals. She and O'Malley are the authors of the book *Learning Strategies in Second Language Acquisition*, to be published by Cambridge University Press in 1989.

Sue G. Derber
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Ms. Derber has been a first grade teacher for 19 years. Between 1984 and 1987, she was involved in a listening comprehension study involving reciprocal teaching approaches developed by Dr. Annemarie Palincsar. She has participated in the preparation of a video tape on reciprocal teaching and has presented sessions on reciprocal teaching at various workshops.

Michael Dowd
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Mr. Dowd is responsible for developing and delivering staff development activities to regular and special education teachers. As a classroom teacher, he was actively involved in teaching metacognitive study strategies. He maintains an interest in active learning and teaching with an emphasis on metacognitive learning and the teaching of thinking skills.

Edwin S. Ellis, Ph.D.
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Dr. Ellis is a co-author of the Learning Strategies Curriculum. He currently is developing a manual on how to develop and implement a learning strategy intervention and two teachers' manuals, one addressing ways to increase students' reading comprehension from text and the other for teaching a strategic approach to point-of-view writing. His current research interests are in ways general education teachers can facilitate strategic learning in regular classroom settings.

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Mr. Feldman, in his capacity as program specialist in the Riverside County Office of Education, is responsible for developing programs for teachers, parents, and students in regular and special education. He has served as a trainer with the University of Kansas' Strategy Intervention Model. Mr. Feldman also has an interest in cooperative learning, cognitive strategy use at the elementary level, and self-esteem and affective development.

Carole S. Fine
LD Resource/Consulting Teacher, Thomas Paine School
Urbana School District #116, Illinois
and
Center for the Study of Reading
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Ms. Fine currently is on professional leave from the Urbana School District. She is serving as a coordinator in Urbana for the University of Illinois Center for the Study of Reading Reciprocal Teaching Project. Her other professional interests include written language development in LD students, math problem solving, and computer assisted instruction.

Steve Graham, Ed.D.
Department of Special Education
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Dr. Graham has been involved in several studies designed to investigate the role of strategy instruction in improving the composition skills of learning disabled students. His current research interests include writing and strategy instruction.

Kathy Haagenson
Resource Room Teacher, Orange Grove Junior High
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Ms. Haagenson is a teacher of seventh and eighth graders in the areas of English, reading, and social studies. She has participated in a project studying the use of interactive teaching strategies conducted by Candace Bos. Writing curriculum for use with regular and special education students and presenting staff development are among her current interests.

James Hargest
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Mr. Hargest, along with Dr. Carolyn Wood, Supervisor of Research, Testing, and Evaluation for Harford County Schools, and other district staff members, contributed to the development of two curricular guides that incorporate a learning strategies approach. Those guides are: *A Learning Strategies Approach to Functional Mathematics for Students with Special Needs* (1985) and *Teaching Writing to Students with Special Needs: A Learning Strategies Approach* (1988). Both Drs. Donald Deshler and Karen Harris served as consultants for the production of these guides.

Karen Harris, Ed.D.
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Dr. Harris has been involved in a series of studies validating self-instructional strategy training regimen among mildly to moderately handicapped learners in the areas of written language and mathematical problem solving. Her research interests lie in the areas of cognitive-behavior modification/cognitive strategy instruction, cognitive-behavioral assessment techniques, and self-regulation procedures effects on task behavior and academic learning among learning disabled children.

Beth Ann Herrmann, Ph.D.
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Dr. Herrmann's research interests are cognitive strategy instruction, cognitive assessment techniques, staff development, teacher metacognitive control of instruction, and effective instruction at the teacher education level. Recently, she has conducted reading and mathematics studies of the use of the direct explanation model of instruction and a series of studies focusing on the development of teachers' knowledge structures and interrelationships between teachers' knowledge structures and their instructional practice.

Michael F. Hock
Special Education Department Chair
Hempstead Senior High School
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Mr. Hock has taught for 16 years, ten of them as a high school learning disabilities instructor. Since 1986, he also has served as a teacher trainer for the University of Kansas Institute for Research in Learning Disabilities Strategies Intervention Model. He has an interest in developing a strategy curriculum scope and sequence for mildly handicapped students in grades 5-12.

Clayton Keller, Ph.D.
Department of Child and Family Development
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218-726-7233

Dr. Keller taught behavior disordered students for eight years prior to starting his doctoral work in special education at the University of Virginia. He recently co-authored an article with John Wills Lloyd titled "Cognitive Training Implications for Arithmetic Instruction." Dr. Keller's current research interests are in the areas of learning disabilities in math, effective teaching for mainstreamed students, and subtypes of learning disabled students.

Pamela Knorr
Principal
Tomah Junior High School
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Ms. Knorr currently serves as a middle school reading specialist responsible for coordination of the school reading program. She has directed the reading instruction for the ESL and Severe ED Exceptional Needs Program and the reading staff development efforts for over 50 content area teachers.

B. Keith Lenz, Ph.D.
Institute for Research in Learning Disabilities
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University of Kansas
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Dr. Lenz's research interests are primarily in the area of interventions for adolescents at risk for school failure. Currently he is developing a series of books on the strategic delivery of content for use by regular classroom teachers. Dr. Lenz is serving as coordinator for a project designed to develop materials and training packages related to infusing the results of the Institute's work into college and university teacher training programs.

David Martin, Ph.D.
Dean, School of Education
Gallaudet College
Washington, DC 20002
202-651-5520

Dr. Martin is the Dean of the School of Education at Gallaudet College. He has been actively involved in researching the effectiveness of cognitive and metacognitive educational approaches with hearing impaired students. Dr. Martin also is concerned with developing models for infusing higher level thinking skills into the teacher education curriculum.

Cathy Mathias
Resource Teacher, E.L. Wright Middle School
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Ms. Mathias has taught for twelve years, ten of them in special education classes. She is the special education department chair at her school and serves on the district level special services advisory council. She has taught cognitive strategy instruction to learning disabled students at the middle school level.

Evelyn Maycumber
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North East Florida Educational Consortium
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Ms. Maycumber is the reading specialist for the eleven member districts of the North East Florida Educational Consortium. During the past school year she provided staff development to eleven pilot schools including demonstrations of effective learning strategies using the approach developed by Dr. Scott Paris of the University of Michigan. Her other interests include cooperative learning, process writing, and ways to empower students to take charge of their own learning.

Tina Miller
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Tina Miller is in her nineteenth editorial year in educational publishing and is currently executive editor for development of reading materials at D.C. Heath and Company. After graduating with a Bachelor of Arts in English from Colby College, her professional involvement in education began with a Peace Corps teaching assignment in Thailand. Graduate school at UCLA and teaching developmental/remedial reading in Florida and New Hampshire followed. Tina finds maintenance of the delicate balance among research, classroom, and business considerations the most fascinating challenge of educational publishing.

Annemarie Sullivan Palincsar, Ph.D.
Department of Counseling, Educational Psychology, and Special Education
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Dr. Palincsar is co-developer of the reciprocal teaching instructional procedure. She has conducted several studies of the effectiveness of this method primarily in the teaching of reading. Dr. Palincsar's research interests include the instruction of students with listening and reading comprehension problems and peer collaboration in problem-solving activities.

Michael Pressley, Ph.D.
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Dr. Pressley has written widely in the areas of children's learning, cognition and memory. He has served on the faculties of California State University at Fullerton, University of Wisconsin, Notre Dame University, and Max Planck Institute. In the fall of 1989 he will join the faculty of the University of Maryland. Dr. Pressley's current interests are in the areas of children's learning, cognition, and strategy development and use.

Taffy E. Raphael, Ph.D.
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Dr. Raphael is involved in research to expand our understanding of effective instruction in literacy. She is an author of the recently published basal reading series by Holt, Rinehart and Winston. Dr. Raphael's recent articles have appeared in *Reading Teacher*, *Exceptional Children*, and *Learning Disabilities Quarterly*.

Charles M. Reigeluth, Ph.D.
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Dr. Reigeluth recently joined the faculty of Indiana University after being associated with Syracuse University. He served as editor of the recent book *Instructional Theories in Action* and co-authored *Textbooks: A Question of Quality*, in the Phi Delta Kappa Fastback Series. His interests include instructional strategies for the acquisition of meaningful understanding; criteria for evaluating and selecting textbooks, courseware, and other educational resources; and prescriptions for the design of computer-based educational simulations.

Alan Sheinker, Ed.D.
Director of Research and Staff Development
Sweetwater County School District Number One, Wyoming
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307-382-2474

Mr. Sheinker's responsibilities include coordinating district research activities, chairing curriculum committees, and directing and coordinating textbook adoptions. He is the Director of the Professional Development Center and site manager of the Leadership in Educational Administration Developmental grant. He is involved in a

project to determine whether the effect of a metacognitive component to content instruction results in discernible improvements in content learning and metacognitive skills.

Jan Sheinker
Supervisor of the Alternative High School
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Ms. Sheinker's current responsibilities include administration of the Alternative High School and site supervisor of Carl Perkins Handicapped and Disadvantaged grants. She is involved in research to ascertain whether a metacognitive component to content instruction results in discernible improvements in content learning and metacognitive skills as compared to content instruction alone.

Linda Stevens
Publication and Training Consultant
Pennsylvania Resource and Information Center for Special Education (PRISE)
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Ms. Stevens coordinates the production of a statewide newsletter, the "PRISE Reporter," which reaches 17,000 special educators. Recent issues of the newsletter focused on research on improving textbook usability and cognitive and metacognitive learning strategies. She, along with Ed Ellis, has delivered training for the Council for Exceptional Children in learning strategies as a part of the Academy of Effective Instruction. Currently, Ms. Stevens is pursuing her doctoral studies in the Department of Educational Psychology at the University of Minnesota.

Elizabeth Watson
University of South Carolina
Education Student

Ms. Watson is a student in the College of Education at the University of South Carolina.

Elena Dworkin Wright
Vice President, Editorial
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Before becoming an editor, Ms. Wright taught ED and LD children in private and public settings. As an editor, she has worked with researchers and practitioners to help promising curricula become published products. She worked with Beau Jones of NCREL, among others, in the production of *Insights-Reading as Thinking*, a basal alternative. Mastery Education's *Writing as Thinking* program is based upon the work of Stein and Trabasso, Britton, Graves, Scardamalia, Flowers, Hennings, Hillocks, and the National Writing Project.

Guests

Ed Gickling, Ph.D.
Assistant Executive Director for Professional Development
Council for Exceptional Children

Kathy Zantal-Wiener
Policy Specialist
Council for Exceptional Children

Cynthia Warger, Ph.D.
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Information Center for Special Education Media and Materials Staff

Victor Fuchs
Director

Carol Bianchini Daniels
Associate Director

Charles Lynd
Information Specialist

Karen Scheid
Research Specialist

APPENDIX B

Sample Record from the ICSEMM Database

-TITLE-	OPEN COURT READING AND WRITING: THE COMPLETE BASAL READING PROGRAM
-AUTHOR-	Ann Brown, Joseph Campione, Carl Bereiter, Marlene Scardamalia, Valerie Anderson, Walter Kintsch
-FORMAT-	Print: complete K-6 basal series; basic materials include readiness kit, student readers, teacher's guides, teacher's resource books (includes worksheets, transparency masters, charts, posters, etc.); practice materials include workbooks and worksheets; supplemental materials include games, kits, cards, activity sheets, charts, and inservice videos; test and management materials include informal reading inventory, placement tests, unit tests, individual level test booklets, student and class record cards
-COST-	Moderately priced basal program; contact publisher for sales representative
-READING-	No readability formulas were applied; program uses "real literature" and publisher states that the stories selected are developmentally appropriate
-GRADE-	Ki,1.0,2.0,3.0,4.0,5.0,6.0
-INTEREST-	Ki,1.0,2.0,3.0,4.0,5.0,6.0

-DESCRIPTION- This basal program covers the full spectrum of the language arts, with special emphasis upon the integration of reading, writing, and language skills taught in the context of literature ranging from children's classics to contemporary authors and content-area reading of nonfiction selections. The use of formal learning strategies to develop skills is an integral part of the program, and the teacher's guide is designed, along with inservice videotapes (optional), to help teachers implement the use of the strategies. The Guide serves as a handbook for modeling the strategies taught in order to foster the development of independent reading skills.

Reading strategies employed include: setting reading goals and expectations, clarifying, summarizing, predicting, and asking questions. Writing strategies include: planning, setting writing goals, considering readers, using reading to improve writing, elaborating, and revising content. Study and research strategies taught include responding to new information and note taking.

Reading and writing skills covered include: listening and speaking skills, visual and

auditory recognition, decoding (phonics approach), structural analysis, vocabulary skills, literature, reading comprehension, critical thinking, writing, grammar (usage and mechanics), and study and research skills.

Student reader-anthologies form the core of the program, which covers kindergarten through grade 6. The program does not adhere to any reading level formula, but attempts to provide motivation through stories that are well illustrated and developmentally appropriate. Cooperative learning activities are encouraged, and slower and more advanced readers are asked to work together. The program emphasizes that slower students require a strong foundation of learning strategies. Lesson plans provide detailed suggestions for individualization, including enrichment for gifted students. The testing and management components provide diagnostic tests that are designed to assess both performance and the thinking process behind the child's answers.

-APPROACH- Learning strategies: reading, writing; whole language, cooperative learning

-EFFECTIVENESS- Field Test: The publisher states that this program incorporates the results of research conducted during the last ten years in the fields of reading, writing, teaching and learning. The program was pilot tested in classrooms for three years in 28 schools selected to represent a diversity of urban, suburban, and rural settings. More than 85 teachers and supervisors used the materials with 5300 students who represented a diversity of ethnic and racial backgrounds. Changes and recommendations made during the field trials were incorporated into the published edition. Formal and informal testing of the program continues. Selected school systems are being asked to evaluate students using the program with standardized tests (not Open Court's tests) administered at the beginning and end of the school year. Contact the publisher directly for additional information, including a list of schools that participated in the pilot test.

-PUBLISHER- Open Court Publishing Company

-ADDRESS- P.O. Box 599
Peru, Illinois
800/435-6850
800/892-6831 (in Illinois)

-ALPHA- Open Court Publishing Company

-SOURCE- Publisher brochures

-ACCESSION-

-CATALOG- 1989

-ALL- SPEDPROD

-END-

BIBLIOGRAPHY

Allington, R. (1988, August). *Small group report--group 1, August 18.* Presentation at the ICSEMM Instructional Methods Forum, Washington, DC.

Andrews, J. (1988). Deaf children's acquisition of prereading skills using the reciprocal teaching procedure. *Exceptional Children, 54*, 349-355.

Arbitman-Smith, R., Haywood, H. C., & Bransford, J. D. (1984). Assessing cognitive change. In P. Brooks, R. Sperber, & M. McCauley (Eds.), *Learning and Cognition in the Mentally Retarded* (pp. 433-471). Hillsdale, NJ: Erlbaum.

Baker, L., & Brown, A. L. (1984). Cognitive monitoring in reading. In J. Flood (Ed.), *Understanding Reading Comprehension* (pp. 21-44). Newark, DE: International Reading Association.

Beals, V. L. (1984). The effectiveness of large group instructional procedures on the acquisition of learning strategies by LD adolescents. (Doctoral dissertation, Lawrence: University of Kansas). *Dissertation Abstracts International, 45*, 2478A.

Belmont, J., Butterfield, E., & Borkowski, J. (1978). Training retarded people to generalize memorization methods across tasks. In M. M. Gruneberg, P. E. Morris, & R. N. Sykes (Eds.), *Practical Aspects of Memory*. London: Academic Press.

Borkowski, J. G. & Cavanaugh, J. C. (1979). Maintenance and generalization of skills and strategies by the retarded. In N. R. Ellis (Ed.), *Handbook of Mental Deficiency: Psychological Theory and Research*, (pp. 569-608), 2d ed. Hillsdale, NJ: Erlbaum.

Borkowski, J. G., Reid, M. K., & Kurtz, B. (1984). Metacognition and retardation: Paradigmatic, theoretical, and applied perspectives. In D. Brooks, R. Sperber, & C. McCauley (Eds.), *Learning and Cognition in the Mentally Retarded* (pp. 55-75). Hillsdale, NJ: Erlbaum.

Borkowski, J. G., Weyhing, R., & Turner, L. (1986). Attributional retraining and the teaching of strategies. *Exceptional Children, 53*, 130-137.

Bos, C. S., & Filip, D. (1984). Comprehension monitoring in learning disabled and average students. *Journal of Learning Disabilities, 17*, 229-233.

Brainin, S. S. (1985). Mediating learning pedagogic issues in the improvement of cognitive functioning. In E. W. Gordon (Ed.), *Review of Research in Education* (Vol. 12, pp. 121-154). Washington, DC: AERA.

Brown, A. L. (1974). The role of strategic behavior in retardate memory. In N. R. Ellis (Ed.), *International Review of Research in Mental Retardation* (Vol. 7). New York: Academic Press.

Brown, A. L. (1980). Metacognitive development and reading. In R. S. Spiro, B. B. Bruce, & W. L. Brewer (Eds.), *Theoretical Issues in Reading Comprehension*. Hillsdale, NJ: Erlbaum.

Brown, A. L. (1985, April). *Teaching students to think as they read: Implications for curriculum reform*. (Reading Education Report No. 58). Urbana: University of Illinois, Center for the Study of Reading.

Brown, A. L., & Barclay, C. R. (1976). The effects of training specific mnemonics on the metamnemonic efficacy of retarded children. *Child Development, 47*, 71-80.

Brown, A. L., Bransford, J., Ferrara, R., & Campione, J. (1983). Learning, remembering, and understanding. In J. Flavell & E. Markman (Eds.), *Handbook of Child Psychology, Vol. 3: Cognitive Development* (pp. 77-166). New York: John Wiley.

Brown, A. L., & Campione, J. (1986). Psychological theory and the study of learning disabilities. *American Psychologist, 41*, 1059-1068.

Brown, A. L., Campione, J. C., & Barclay, C. R. (1979). Training self-checking routines for estimating test readiness: Generalizations from list learning to prose recall. *Child Development, 50*, 501-512.

Brown, A. L., & Palincsar, A. S. (1982). Inducing strategic learning from text by means of informed self-control training. *Topics in Learning and Learning Disabilities, 2*, 1-17.

Brown, A. L., & Palincsar, A. S. (1987). Reciprocal teaching of comprehension strategies: A natural history of one program for enhancing learning. In J. Day & J. Borkowski (Eds.), *Intelligence and Exceptionality: New Directions in Theory, Assessment and Instructional Practices* (pp. 81-132). Norwood, NJ: Ablex.

Busch, J. (1988, September). Interviewed by Karen Scheid via telephone.

Campione, J. C., & Brown, A. L. (1977). Memory and metamemory development in educable retarded children. In V. Kail, Jr., and J. W. Hagen (Eds.), *Perspectives on the Development of Memory and Cognition* (pp. 367-406). Hillsdale, NJ: Erlbaum.

Ceci, S., & Baker, J. (1987). Commentary: How should we conceptualize the language problems of learning disabled children? In S. Ceci (Ed.), *Handbook of Cognitive, Social, and Neuropsychological Aspects of Learning Disabilities* (Vol. 2, pp. 103-112). Hillsdale, NJ: Erlbaum.

Chan, L., & Cole, P. (1986). The effects of comprehension monitoring training on the reading competence of learning disabled and regular class students. *Remedial and Special Education, 7*(4), 33-40.

Chan, L., Cole, P., & Barfett, S. (1987). Comprehension monitoring: Detection and identification of text inconsistencies by LD and normal students. *Learning Disability Quarterly, 10*, 114-124.

Clark, F., Deshler, D., Schumaker, J., Alley, G., & Warner, M. (1984). Visual imagery and self-questioning strategies to improve comprehension of written material. *Journal of Learning Disabilities, 17*, 145-149.

Daniels, C. (1988a). Interview via telephone of Dr. Fran Clark, University of Kansas Institute for the Study of Learning Disabilities.

Daniels, C. (1988b). Interview via telephone of Dr. Annemarie Palincsar, Michigan State University.

Daniels, C. (1989). Interview via telephone of Dr. Scott Paris, University of Michigan.

Delclos, V., Bransford, J., & Haywood, C. (1984). A program for teaching thinking: Instrumental enrichment. *Childhood Education, 60*, 256-259.

Derber, S. (1988, August). *Reciprocal Teaching: A Teacher's Perspective.* Presentation at the ICSEMM Instructional Methods Forum, Washington, D.C.

Deshler, D., Alley, G., Warner, M., & Schumaker, J. (1981). Instructional practices for promoting skill acquisition and generalization in severely learning disabled adolescents. *Learning Disability Quarterly, 4*, 415-421.

Deshler, D., & Schumaker, J. (1986). Learning strategies: An instructional alternative for low-achieving adolescents. *Exceptional Children, 52*, 583-590.

Deshler, D., Schumaker, J., & Lenz, B. K. (1984a). Academic and cognitive interventions for LD adolescents: Part I. *Journal of Learning Disabilities, 17*, 108-117.

Deshler, D., Schumaker, J., Lenz, B. K., & Ellis, E. (1984b). Academic and cognitive interventions for LD adolescents: Part II. *Journal of Learning Disabilities, 17*, 120-129.

Dowd, M. (1988, August). *Small group report--group 3, August 18.* Presentation at the ICSEMM Instructional Methods Forum, Washington, DC.

Duffy, G. (1988, September). Interviewed by Karen Scheid via telephone.

Duffy, G., & Roehler, L. (1987). Teaching reading skills as strategies. *Reading Teacher, 40*, 414-421.

Duffy, G., Roehler, L., & Herrmann, B. A. (1988). Modeling mental processes helps poor readers become strategic readers. *The Reading Teacher*, 41, 762-767.

Duffy, G., Roehler, L., Meloth, M., Polin, R., Rackliffe, G., Tracy, A. & Vaurus, L. B.A. (1987a). Developing and evaluating measures associated with strategic reading. *Journal of Reading Behavior, 19*, 223-246.

Duffy, G., Roehler, L., Meloth, M., Vaurus, L., Book, C., Putnam, J., & Wesselman, R. (1986a). The relationship between explicit verbal explanations during reading skill instruction and student awareness and achievement: A study of reading teacher effects. *Reading Research Quarterly, 21*, 237-252.

Duffy, G., Roehler, L., & Putnam, J. (1987b). Putting the teacher in control: basal reading textbooks and instructional decision making. *The Elementary School Journal, 87*, 357-366.

Duffy, G., Roehler, L., & Rackliffe, G. (1986b). How teachers' instructional talk influences students' understanding of lesson content. *The Elementary School Journal, 87*(1), 3-16.

Duffy, G., Roehler, L., Sivan, E., Rackliffe, G., Book, C., Meloth, M., Vaurus, L., Wesselman, R., Putnam, J., Bassiri, D. (1987c). Effects of explaining the reasoning associated with using reading strategies. *Reading Research Quarterly, 22*, 347-368.

Ellis, E. S. (1986). The role of motivation and pedagogy on the generalization of cognitive strategy training. *Journal of Learning Disabilities, 19*, 66-70.

Ellis, E. S. (1988, June). *Suggestions for incorporating the principles of cognitive and metacognitive theories in the design of media and materials.* Presentation at the ICSEMM Publishers Workshop, Washington, DC.

Ellis, E. S., Lenz, B. K., & Sabornie, E. J. (1987a). Generalization and adaptation of learning strategies to natural environments: Part 1: Critical agents. *Remedial and Special Education, 8*(1), 6-20.

Ellis, E. S., Lenz, B. K., & Sabornie, E. J. (1987b). Generalization and adaptation of learning strategies to natural environments: Part 2: Research into practice. *Remedial and Special Education, 8*(2), 6-23.

Englert, C. S., & Raphael, T. (1988). Constructing well-formed prose: Process, structure and metacognitive knowledge. *Exceptional Children, 54*, 513-520.

Englert, C. S., Raphael, T., Lear, K., & Anderson, L. (1988). Students' metacognitive knowledge about how to write informational text. *Learning Disability Quarterly, 11*, 18-46.

Erickson, M. (1987). Deaf readers reading beyond the literal. *American Annals of the Deaf, 132*, 291-294.

Feldman, K. (1988, August). *Small group report--group 2B, August 17.* Presentation at the ICSEMM Instructional Methods Forum, Washington, DC.

Fine, C. (1988, August). *Reciprocal teaching: staff development issues.* Presentation at the ICSEMM Instructional Methods Forum, Washington, DC.

Flavell, J. (1979). Metacognition and cognitive monitoring: A new area of cognitive development inquiry. *American Psychologist, 34,* 906-911.

Flower, L., & Hayes, J. R. (1981). A cognitive process theory of writing. *College Composition and Communication, 32,* 365-387.

Gardner, M. (1985). Cognitive psychological approaches to instructional task analysis. In E. W. Gordon (Ed.), *Review of Research in Education* (Vol. 12, pp. 157-195). Washington, D.C.: AERA.

Ghatala, E. (1986). Strategy-monitoring training enables young learners to select effective strategies. *Educational Psychologist, 21*(1-2), 43-54.

Graham, S. (1988, August). *Small group report--group 1, August 17.* Presentation at the ICSEMM Instructional Methods Forum, Washington, D.C.

Graham, S., & Harris, K. (1987, September). Improving composition skills of inefficient learners with self-instructional strategy training. *Topics in Language Disorders, 7,* pp. 66-77.

Graham, S., & Harris, K. (1988). *Improving learning disabled students' skills at generating essays: Self-instructional strategy training.* Paper presented at the 1988 annual meeting of the American Educational Research Association, New Orleans.

Graham, S., & Harris, K. (in press). Cognitive training: Implications for written language. In J. Hughes & R. Hall (Eds.), *Handbook of Cognitive Behavioral Approaches in Educational Settings.* New York: Guilford.

Graham, S., Harris, K., & Sawyer, R. (1987). Composition instruction with learning disabled students: Self-instructional strategy training. *Focus on Exceptional Children, 20*(4), 1-11.

Harford County Public Schools (1985, Fall). *A learning strategies approach to functional mathematics for students with special needs.* Bel Air, Maryland.

Harford County Public Schools (1988). *Teaching writing to students with special needs: A learning strategies approach.* Bel Air, Maryland.

Harris, K. (1988, August). *Implications of learning strategy research for special education students.* Presentation at the ICSEMM Instructional Methods Forum, Washington, D.C.

Harris, K., & Graham, S. (1985). Improving learning disabled students' composition skills: Self-control strategy training. *Learning Disability Quarterly, 8,* 27-36.

Harris, K., & Graham, S. (1988, Winter). Self-instructional strategy training. *Teaching Exceptional Children, 20,* 35-37.

Harris, K., Graham, S., & Freeman, S. (1988). Effects of strategy training on metamemory among LD. *Exceptional Children, 54,* 332-338.

Herrmann, B. A. (1988a, August). *Small group report--group 2A, August 17.* Presentation at the ICSEMM Instructional Methods Forum, Washington, D.C.

Herrmann, B.A. (1988b). Two approaches for helping poor readers become more strategic. *The Reading Teacher, 42,* 24-28.

Herrmann, B.A. (in press). Explicit explanation of problem solving strategies. *Reading Research and Instruction.*

Herrmann, B.A. (in progress). An exploratory study of the effects of peer-monitoring and peer collaboration on preservice teachers' knowledge structure.

Herrmann. B.A., Duffy, G., & Roehler, L. (1985). A descriptive study of the effects and characteristics of direct teacher explanation in a clinical setting. *Research on Teaching,* Michigan State University, East Lansing, Michigan.

Herrmann, B.A., & Marshall, K., (in progress). An exploratory study of the effects of peer monitoring on the regular and special education teachers' abilities to collaborate.

Hock, M. (1988, August). *The strategies intervention model: A plan for student academic and social independence*. Presentation at the ICSEMM Instructional Methods Forum, Washington, DC.

Jones, B. F., Palincsar, A. S., Ogle, D. S., & Carr, E. G. (Eds.). (1987). *Strategic teaching and learning: Cognitive instruction in the content areas*. Alexandria, Virginia: ASCD.

Kellas, G., Ashcraft, M. H., & Johnson, N. S. (1973). Rehearsal processes in the short-term memory performance of mildly retarded adolescents. *American Journal of Mental Deficiency, 77*, 670-679.

Kendall, C., Borkowski, J., & Cavanaugh, J. (1980). Metamemory and the transfer of an interrogative strategy by EMR children. *Intelligence, 4*, 255-270.

Kolligian, J., Jr., & Sternberg, R. S. (1987). Intelligence, information processing, and specific learning disabilities: A triarchic synthesis. *Journal of Learning Disabilities, 20*, 8-17.

Lenz, B. K. (1988, August). *The learning strategies curriculum of the strategies intervention model*. Presentation at the ICSEMM Instructional Methods Forum, Washington, D.C.

Levin, J. (1986). Four cognitive principles of learning-strategy instruction. *Educational Psychologist, 21*(1-2), 3-17.

Luftig, R., & Johnson, R. (1980, September). *Identification and recall of structurally important units in verbal discourse as a function of metacognitive processing of mentally retarded children*. U.S. Special Education Programs Report. Lafayette, IN: Purdue University.

Mathias, C. (1988, June). *Using strategy instruction in the classroom: A teacher's perspective*. Presentation at the ICSEMM Publishers Workshop, Washington, DC.

Meichenbaum, D. (1977). *Cognitive-Behavioral Modification: An Integrative Approach*. Plenum Press, New York.

Meichenbaum, D. (1985). Teaching thinking: A cognitive-behavioral perspective. In S. Chipman, J. Segal, & R. Glaser (Eds.), *Thinking and Learning Skills: Vol 2. Research and Open Questions* (pp. 407-426). Hillsdale, NJ: Erlbaum.

Meyer, B. J. F. (1975). *The organization of prose and its effects in memory*. Amsterdam, Holland: North Holland Publishing Co.

Miller, T. (1988, August). *A publisher's perspective: Decision to publish materials incorporating cognitive/metacognitive strategies*. Presentation at the ICSEMM Instructional Methods Forum, Washington, DC.

Oka, E., & Paris, S. (1987). Patterns of motivation and reading skills in underachieving children. In S. Ceci (Ed.), *Handbook of Cognitive, Social, and Neuropsychological Aspects of Learning Disabilities* (Vol. II, pp. 115-145). Hillsdale, NJ: Erlbaum.

Palincsar, A. S. (1986a, April). *Interactive cognition to promote listening*. Paper presented at the annual meeting of AERA, San Francisco, CA.

Palincsar, A. S. (1986b). Metacognitive strategy instruction. *Exceptional Children, 53*, 118-124.

Palincsar, A. S. (1988, August). *Reciprocal teaching: An instructional method for teaching comprehension and comprehension monitoring strategies*. Presentation at the ICSEMM Instructional Methods Forum, Washington, DC.

Palincsar, A. S., & Brown, A. L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction, 1*, 117-175.

Palincsar, A. S., & Brown, A. L. (1986). Interactive teaching to promote independent learning from text. *The Reading Teacher, 39*, 771-777.

Palincsar, A. S., & Brown, A. L. (1988). Teaching and practicing thinking skills to promote comprehension in the context of group problem solving. *Remedial and Special Education*, *9*(1), 53-59.

Paris, S. & Jacobs, J. (1984). The benefits of informed instruction for children's reading awareness and comprehension skills. *Child Development*, *55*, 2083-2093.

Paris, S., Cross, D., & Lipson, M. (1984). Informed strategies for learning: A program to improve children's reading awareness. *Journal of Educational Psychology*, *76*, 1239-1252.

Paris, S., & Meyers, M. (1981). Comprehension monitoring, memory, and study strategies of good and poor readers. *Journal of Reading Behavior*, *13*, 5-24.

Paris, S., & Oka, E. (1986a). Children's reading strategies, metacognition, and motivation. *Developmental Review*, *6*, 25-56.

Paris, S., & Oka, E. (1986b). Self-regulated learning among exceptional children. *Exceptional Children*, *53*, 103-108.

Paris, S., Wixson, K., & Palincsar, A. S. (1986). Instructional approaches to reading comprehension. In E. Rothkopfed (Ed.), *Review of Research in Education* (Vol 13, pp. 91-128). Washington, DC: AERA.

Pressley, M. (1986). The relevance of the good strategy user model to the teaching of mathematics. *Educational Psychologist*, *21*(1-2), 139-161.

Pressley, M. (1988, June). An overview of cognitive and metacognitive theories as they relate to special education populations and findings of pertinent intervention research. Presentation at The Publishers Workshop, Washington, D.C.

Pressley, M., Goodchild, F., Fleet, J., Zajchowski, R., & Evans, E. (in press, a). The challenges of classroom strategy instruction. *The Elementary School Journal*. (Anticipated publication, March, 1989).

Pressley, M., Johnson, C., Symons, S., McGoldrich, J., & Kurita, J. (in press, b). Strategies that improve children's memory and comprehension of what is read. *Elementary School Journal*.

Pressley, M., & Levin, J. (1987). Elaboration learning strategies for the inefficient learner. In S. Ceci (Ed.), *Handbook of Cognitive, Social, and Neuropsychological Aspects of Learning Disabilities* (Vol. 2, pp. 175-212). Hillsdale, NJ: Erlbaum.

Rabinowitz, M., & Chi, M. (1987). An interactive model of strategic processing. In S. Ceci (Ed.), *Handbook of Cognitive, Social, and Neuropsychological Aspects of Learning Disabilities* (Vol. 2, pp. 83-102). Hillsdale, NJ: Erlbaum.

Reeve, R. A., & Brown, A. L. (1985). Metacognition reconsidered: Implications for intervention research. *Journal of Abnormal Child Psychology*, *13*, pp. 343-356.

Reid M. K., & Borkowski, J. (1985). *A cognitive-motivational training program for hyperactive children*. Paper presented at the Society for Research and Child Development, Toronto.

Roehler, L., & Duffy, G. (in press). Teachers' instructional actions. Chapter for inclusion in *Handbook of Reading Research* (Vol. 2).

Roehler, L., Duffy, G., Vaurus, L., Putnam, J., Wesselman, R., Sivan, E., Book, C., & Meloth, M. (1986, July). *Teacher explanation: A final report of the 1983-84 study* (Research Series No. 170). East Lansing, MI: Michigan State University, Institute for Research on Effective Teaching.

Ryan, E. B., Short, E., & Weed, K. A. (1986). The role of cognitive strategy training in improving the academic performance of learning disabled children. *Journal of Learning Disabilities*, *19*, 521-529.

Samuels, S. J. (1987). Information processing abilities and reading. *Journal of Learning Disabilities*, *20*, 18-22.

Schmidt, J. L. (1984, November). The effects of four generalization conditions on learning disabled adolescents' written language performance in the regular classroom. *Dissertation Abstracts International, 45*, 1367A.

Schumaker, J., Deshler, D., Alley, G., Warner, M., & Denton, P. (1982). Multipass: A learning strategy for improving reading comprehension. *Learning Disability Quarterly, 15*, 295-304.

Schumaker, J., & Hazel, J. S. (1984). Social skills assessment and training for the learning disabled: Who's on first and what's on second? Part I. *Journal of Learning Disabilities, 17*, 422-431.

Sheinker, J. (1988, August). *Small group report--group 2, August 18.* Presentation at the ICSEMM Instructional Methods Forum, Washington, D.C.

Spear, L., & Sternberg, R. (1987). An intervention-processing framework for understanding reading disability. In S. Ceci (Ed.), *Handbook of Cognitive, Social, and Neuropsychological Aspects of Learning Disabilities* (pp. 3-31). Hillsdale, NJ: Erlbaum.

Torgesen, J. (1985). Memory processes in reading disabled children. *Journal of Learning Disabilities, 18*, 350-357.

Turnure, J. (1986). Instruction and cognitive development: Coordinating communication and cues. *Exceptional Children, 53*, 109-117.

Wiens, J.W. (1983). Metacognition and the adolescent. *Journal of Learning Disabilities, 16*, 144-149.

Wong, B.Y.L. (1985a). Potential means of enhancing content skills acquisition in learning disabled adolescents. *Focus on Exceptional Children, 17*(5), 1-18.

Wong, B.Y.L. (1985b). Skill questioning instructional research: a review. *Review of Educational Research, 55*, 227-268.

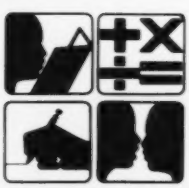
Wong, B.Y.L. (1986a). A cognitive approach to teaching spelling. *Exceptional Children, 53*, 169-173.

Wong, B.Y.L. (1986b). Metacognition and special education: a review of a view. *The Journal of Special Education, 20*, 9-29.

Wong, B.Y.L. (1987). How do the results of metacognition research impact on the learning disabled individual? *Learning Disability Quarterly, 10*, 189-195.

Wong, B.Y.L., & Jones, W. (1982). Increasing metacomprehension in learning disabled and normally achieving students through self-questioning training. *Learning Disability Quarterly, 5*, 228-240.

Wong, B.Y.L., & Wilson, M. (1984). Investigating awareness of and teaching passage organization in learning disabled children. *Journal of Learning Disabilities, 17*, 477-482.



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